April 18, 1939. J. F. HINES 2,154,749

PRECISION FLASK AND JACKET

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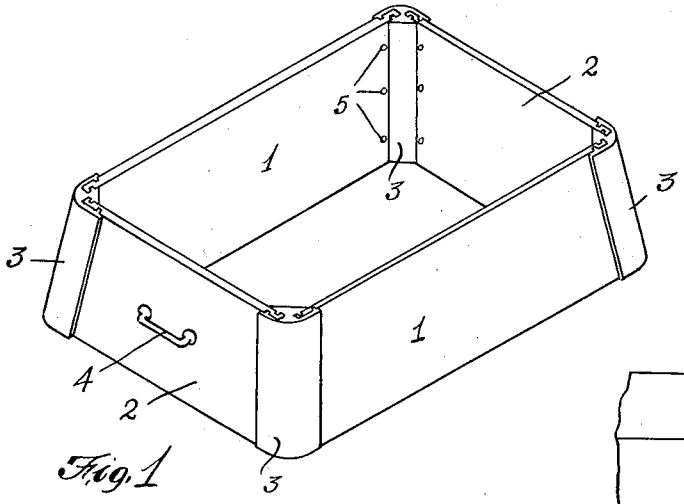


Fig. 1

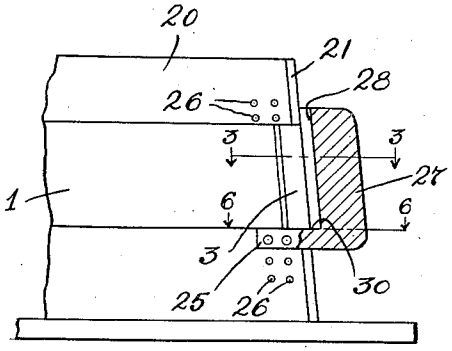


Fig. 2

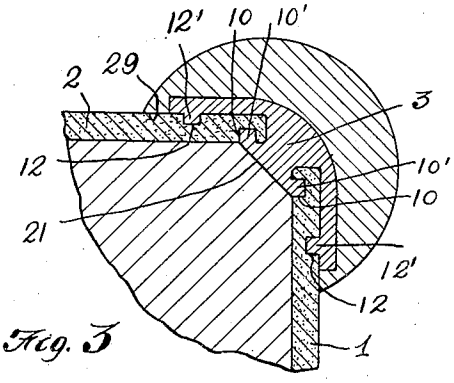


Fig. 3

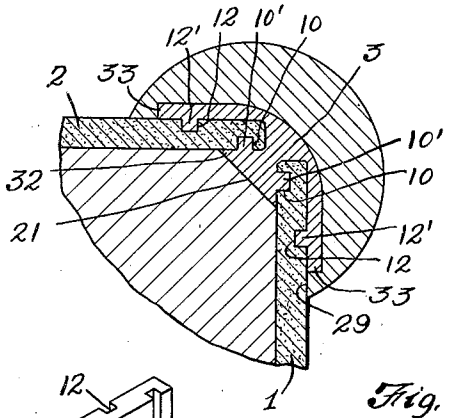


Fig. 4

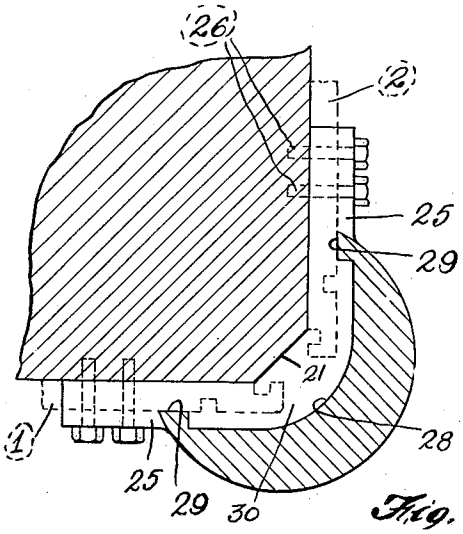


Fig. 6

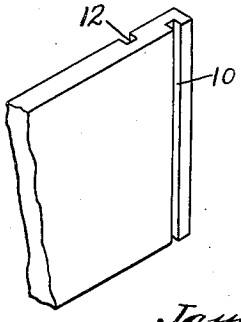


Fig. 5

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PRECISION FLASK AND JACKET

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2 Claims. (Cl. 22—112)

This invention relates to jackets and flasks for foundry work and to a method of making the same whereby a series of flasks or jackets of precise interchangeability can be made, using only sides made entirely of preformed slabs, preferably non-metallic, and connecting them permanently, rigidly, and accurately at the corners without the use of rivets, bolts, or the like. In some respects the corner-forming feature constitutes an improvement on my earlier Patent No. 2,006,240, issued June 25, 1935, although in other aspects it is distinct therefrom.

In the formation of mold flasks and mold jackets two highly important considerations are light weight and accuracy of size, the accuracy being important to enable the flask or jacket manufacturer to duplicate the size exactly for future orders of replacements or additional stock.

Accuracy of size is essential for the reason that the usual foundry practice is to make sand molds in large quantities from a single flask or a few flasks, remove them from the flask and set them out on the floor for pouring. In order to keep the pouring pressure from bursting the mold, it is necessary to put a jacket on the mold while pouring, and this jacket must be an exact counterpart in dimensions of the flask in order to give the accurate fit required for the production of precise castings. Any failure of exact correspondence between the flask in which the mold was made and the jacket which surrounds it while the casting is being poured will permit some yielding of the sand with corresponding discrepancies or inaccuracies of the finished casting. Although it is true that for rough work jackets are sometimes crudely made of boards nailed or screwed together, nevertheless even for rough castings such jackets cause production losses due to failure of the jacket to sustain all parts of the sand mold perfectly against lateral pressure, and are impossible for accurate castings, particularly where the castings are large or complicated. A further difficulty with wood jackets is that when the mold breaks, permitting metal to flow through and against the wall, the molten metal burns the wood and destroys the jacket.

The slightest discrepancy between the size of the flask and the size of the jacket which is afterwards applied will injure the mold, in some instances so seriously as to destroy its capability of making the desired casting and hence the mold completely loses its usefulnes. Lightness of weight is necessary on account of the great amount of manual labor necessary in applying and removing such flasks and jackets.

Objections to iron and aluminum flasks and jackets are weight in the case of iron, and expense in the case of aluminum. To avoid both, the amount of metal is reduced, making a thin-walled mold container, likely to be broken or get holes punched in the walls, and with aluminum the walls may be burned through by iron spilled on them.

Little or no effort has hitherto been devoted to the use in flask jacket manufacture of composition materials of the synthetic board variety, largely because of the difficulties of making a permanently accurate fit and a solid joint that will not weave,—an inherent disadvantage which such material shares with wood. To obtain and maintain proper fit it has hitherto been necessary to use such boards in the form of panel inserts in metal frames.

A further aim of the invention is a corner construction enabling the use of board walls directly, that is, without framing. My present invention is also directed to improvements in the direction of greater simplicity and lightness, reduction in costs, diminution of the stock of parts which the foundry supply maker must carry in order to make a variety of flask and jacket sizes, and the production of a flask not readily injured by rough treatment or severe service.

Thus an important aim of my present invention is to produce a jacket or flask which combines the advantages of wood as to lightness and in some measure as to ease of construction, with the advantages of metal as to strength, freedom from warping, freedom from injury by molten metal spilled thereon, and as to maintenance of the exactness of fit essential to precision castings.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the structure, means and method hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain structure embodying the invention, such disclosed means constituting, however, but one of various structural forms in which the principle of the invention may be used.

In the accompanying drawing:

Fig. 1 is a perspective of a jacket embodying certain features of my invention;

Fig. 2 is an elevation and partly a vertical section illustrating the means and method for forming a corner;

Fig. 3 is a horizontal section on the plane 3—3 of Fig. 2;

Fig. 4 is a horizontal section corresponding to Fig. 3 but illustrating a narrower joint;

Fig. 5 is an enlarged detailed perspective of an end of a wall slab of Fig. 1, illustrating a preferred preparation for corner attachment; and

Fig. 6 is a section on the plane 6—6 of Fig. 2, with the bottom of the tie mold cavity in plan.

Referring now to Fig. 1, my improved mold container, in the embodiment there illustrated, comprises side walls 1, 1 and end walls 2, 2,

mutually connected by cast corners 3. For convenience handles such as 4 may be fastened to the ends. The side walls and end walls consist of slabs of material, preferably synthetic board, cut to proper size for the height of the container and to an approximate length. One end of such a slab is shown in Fig. 5 and is there illustrated as grooved on opposite sides, as at 10 and 12, near and generally parallel to the upright end. These grooves serve for engagement with the cast metal of the corners 3 as is particularly illustrated in Figs. 3 and 4. Such grooves are a convenient form for engagement of the board slab with the metal, but other or additional holding shapes may be employed for the purpose. For example in Fig. 1 studs 5 are shown protruding inwardly through the boards and flush with the inner surface. These are not rivets, but are lugs formed by flow of the tie metal 3 through holes in the boards.

The corners 3 are formed of cast metal, surrounding and engaging upon the ends of the wall slab, and preferably formed by the apparatus of Fig. 2.

The jacket or flask walls, 1 for the sides and 2 for the ends, might be cut of appropriate height and length from material which the equipment maker keeps on hand in sheets. A suitable board for the purpose is one which does not warp, is not affected either by heat or by the moisture from mold sand, which is tough enough to stand such knocks as it gets in a foundry and stiff enough to retain its shape and not bulge outward from pressure within the mold. The preferred wall material is a synthetic board of predominantly mineral composition and combining toughness with high temperature resistance. A satisfactory material for the purpose is the board commercially known as "Transite".

Such boards are capable of being worked by ordinary wood cutting tools or by slightly modified special tools of similar character, and are much more readily worked than metal.

The preferred way of forming my jacket or flask is upon a frusto-pyramidal molding fixture or block 20, preferably having its corners flattened or chamfered as at 21. Each corner is embraced by a pair of arms 25 bolted to holes such as 26 at different levels in the block 20. These arms 25 also carry a back 27 which includes an inner surface curved at 28, flat at both sides 29, and closed at its bottom 30 at the upper level of the arms 25, and forming with the enclosed parts of the block 20 a mold cavity for the corner tie 3. The arms and the back constitute a single element. When the arms are bolted in place, the flat faces 29 are spaced from the flat sides of the fixture 20 a distance just equal to the thickness of the wall slabs 1, 2, so that when all parts are assembled for pouring the corner the wall slabs rest by gravity on the top edges of the arms 25, as shown in dotted lines in Fig. 6.

As will be apparent by comparing Figs. 3 and 4, the shape of the mold cavity allows considerable latitude in the positioning of the sides and ends 1 and 2, and the finished dimensions are governed by the height of the member 25–27 on the block 20. The joint can be formed with either a wide or a narrow gap between the ends of slabs 1 and 2.

After the wall pieces 1 and 2 have been placed on the block 20 and arms 25, where they rest by gravity, the tie metal is poured in at the top of the corner mold cavity, surrounds the ends of 1 and 2, thus forming ribs 10′ and 12′ in the grooves 10 and 12, making a solid tie and thus firmly locking the slabs in an integral cast metal corner.

Fig. 3 shows a corner of the full width which can be made with a given length of wall slab, because further spread would reduce the amount of metal in the ribs 10′ and thus weaken the corners. The same length of board can be used to make a somewhat smaller container by bringing the board ends closer as in Fig. 4. Inasmuch as the chamfer 21 is of the same width from top to bottom of the block 20, this closer fitting corner has some interior overlap of the metal of the tie 3 as at 32 and some exterior overlap 33.

For making my container the equipment maker may cut the slabs to size from stock, and shape grooves or their equivalent thereon in the same manner as though using wood for the purpose. He is thus not obliged to maintain stocks of or to cast quantities of specially-sized wall pieces, as is necessary with either all-metal containers or with metal-framed containers. As will be presently explained, the accuracy of length and breadth of the finished container is not dependent upon the exact length of the wall slabs.

It will be apparent that the precise form shown for the corner ties is not essential to the invention, although I have shown the preferred form. Various modifications in detail, within the same principles, are possible.

From the foregoing it will be seen that I have devised an article of manufacture and a method, both capable of various embodiments, applicable to the manufacture of flasks or jackets of precise dimensions determined by the position of the member 25–27 on the block 20, the article and method requiring nothing more than the plain slabs and the corner metal.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the means and steps herein disclosed, provided those stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A method of making a mold container which comprises assembling container walls about a forming block, with ends of said walls spaced at the block corners, embracing said ends with a back spaced from said block, and casting metal into the cavity defined by said block, said back, and said wall ends.

2. A method of forming a mold container corner which comprises placing adjacent wall elements on a support with the edges of said elements at or near an edge of said support, said elements including means protruding towards one another when in said position, and forming a mold cavity thereabout by means of a portion of said support as an inner face of said cavity, and a backing element as an outer face of said cavity, and casting metal into said cavity thereby surrounding said protruding means and closing the corner of the container.

JAMES F. HINES.